Remarks

Claims 1-9, 13-19, and 28-46, and 56-64 are pending in the application. Claims 10-12, 20-27, and 47-55 were withdrawn from consideration based on an election of species requirement. No amendments are made herein. No new matter has been added by virtue of this response. Reconsideration of the application in view of this response is requested.

Claim Rejections– 35 U.S.C. § 102(b)

The Examiner rejects claims 1-5, 13, 15, 16, 28, 37, 40, and 56-60 under 35 U.S.C. § 102(b), as being anticipated by Dent. Claim 1 states:

1. An electronically tuned circuit, comprising a power amplifier coupled to an electronically tunable output network, said power amplifier capable of being operated in a large-signal mode, said output network including an electronically tunable reactive component, wherein electronic tuning of said electronically tunable reactive component includes non-motor operated electronic tuning when said power amplifier is operated in said large-signal mode, further wherein a control line extends to said electronically tunable reactive component **for electronically varying reactance of said reactive component over more than two values.**

The examiner states "applicant adds to the claims a control line that extends to the electronically tunable reactive component for electronically varying the reactance over more than two values. Clearly the control line of Dent is fully capable of supplying more than two values."

Applicant would respectfully ask the Examiner to consider that Dent would not work for its intended purpose if the control line to switch 44 in FIG. 2 or control line 50 to switch 76 in FIG. 3 varied over more than two states. The purpose in Dent to provide high efficiency and lossless reactance would be defeated or degraded. Dent provides the embodiment with fixed or variable reactance 42 or 74 along with a switch. As intended by Dent, the switches of FIGS. 2 and 3 provide no more than two states for reactances 42 and 74. In one case the switch is closed, providing one side of reactance 42 or 74 connected to ground. In the other case switch is open, leaving that side of reactance 42 or 74 disconnected from ground and floating. Dent thus achieves "maximum efficiency," as described throughout his background and detailed description. In particular, from column 5 from line 14 to line 61, Dent clearly describes this goal:

> In another preferred embodiment of the present invention, a harmonic

filter network 32 is located between the power amplifier 21 and the load impedance 26 as shown in FIG. 3. The filtering network 32 includes a number of **lossless reactances** 60, 62, 64, 66, 68, 70, 72, and 74 in the form of capacitors and inductors. These reactances are usually fixed and designed to minimize the loss to the desired signal at a particular transmission frequency. In conventional applications of the filtering network 32, these reactances are switched to change the operating frequency of a harmonic filter or an antenna matching network. However, in this preferred embodiment according to the present invention, at least one switched or otherwise variable reactance element 74 is introduced into the matching network by a switch 76 or other reactance variance device controlled by a control line 50. The control line 50 may be connected to a manual switch or to a suitable control device for automatic control. The reactance element 74 may have a fixed or variable reactance. One example of a variable reactance is a varactor diode. Otherwise, a fixed reactance 74 may be switched into the network by a manual switch or electronic switch such as a PIN diode.

The switched or variable reactance element 74 is used to vary the load impedance in order to obtain a different power output level **and still maintain a high efficiency**. The magnitude of the switched reactance element 74 as well as the other reactances within the matching networks 32 are selected so that in a first modulation mode, **when the switch 76 is open**, the load impedance is a resistive load impedance R.sub.1. In the second modulation mode, **corresponding to the switch 76 being closed**, the overall load impedance is a resistive impedance R.sub.2. The resistive load impedances R.sub.1 and R.sub.2 are selected with respect to the power supply voltage **to obtain two distinct power output levels at maximum efficiency** in both of the constant amplitude modulation and the amplitude modulation modes.

Because **switching a resistance/conductance into the circuit simply absorbs power and reduces efficiency**, the antenna impedance **must be changed by switching a lossless reactance/susceptance into or out of the circuit.** Consequently, the filter network 32 must be designed such that a change in susceptance switched across point P to ground results in a change of resistance from R1 to R2 as seen by the power amplifier 21.

Thus, Dent is clear that there are only two values of the control line of FIG. 2 or for control line 50 of FIG. 3, an off voltage and an on voltage. In the off voltage state, the switch is open so no RF signal passes through reactance 42 or reactance element 74. With zero RF current flowing zero power dissipated. Similarly, in the fully on state, the switch is closed, and if the resistance of switch 44 or 76 is low the loss is low. Any intermediate

voltage between these two values would provide for flow of RF current through a more resistive switch, producing more loss and lower efficiency. Favoring lossless reactance and high efficiency, Dent expressly teaches against this possibility.

Also, any voltage higher than the value needed to provide "on" or any voltage more negative than the value needed to provide "off" would put unnecessary stress on switching device 44 or 76 without changing the output value of the switch, on or off. Nothing useful would be accomplished, and lifetime of the switch would be degraded. Dent does not teach or suggest providing such excess voltages either, and doing so would detract from his purpose. Thus, applicant would respectfully ask the Examiner to consider that to achieve the maximum power efficiency and avoid introducing unnecessary stress, the teachings and suggestions of Dent require two and only two values for the voltage to the control line to control switches 44 and 76.

Furthermore, Dent states that "reactance element 74 may have a fixed or variable reactance." Although of course a variable reactance element is capable of being varied, and Dent discloses the idea of using a variable reactance, such as a varacter, which is a two-terminal device, Dent shows no way of varying reactance of such a two terminal device in his circuit. Nor does he teach or suggest varying of reactance element 74 electronically. Nor does he teach or suggest electronically varying its reactance over more than two values. Dent does not teach or suggest electronically varying reactance of reactance element 74 or providing a control line to reactance element 74, either in the text or in FIGS. 2 or 3. Instead Dent provides in FIG. 2 a control line switching device 44, and, in FIG. 3, control line 50 to switching element 76. Thus, Dent does not teach or suggest electronically varying reactance of variable reactance element 74 over any number of values. Although reactance element 74 can be a fixed device or a variable device, Dent only teaches switching reactance element 74 in or out of the circuit to adjust reactance of circuit 32, and in doing so Dent is varying reactance of circuit 32 between just two values.

Claims 1, 40, and 56 all include the limit, a "control line extends to said electronically tunable reactive component **for electronically varying reactance of said reactive component over more than two values.**" Dent does not teach or suggest this limit. Thus, these claims are clearly distinguished from the teachings and suggestions of Dent, and the rejection under 35 U.S.C. § 102(b), as being anticipated by Dent has been traversed.

Furthermore, there is no teaching or suggestion in Dent that the output network is adapted to be tuned to a selected frequency, a fixed frequency, or a variable frequency, as described in claims 2 and 57.

Nor is there teaching or suggestion in Dent to provide the output network adapted to be adjusted to maintain a match with a varying load impedance, as described in claims

3 and 58. Instead Dent has a fixed load impedance, his antenna, and he switches the impedance of the filter located between the power amplifier and the antenna to change the impedance seen by the power amplifier, as described in several places, including column 4, lines 14-15 and lines 53-55.

Nor there is there teaching or suggestion in Dent to provide the output network adapted to modulate the signal, as provided in claim 4. Dent just amplifies a signal that is already modulated, as described in Dent in col 4, lines 15-18, "a modulated, RF carrier is received by a power amplifier 21 for amplification to a power level suitable for radio frequency transmission." While of course a filter, as used by Dent, changes the characteristics of the wave traveling through the filter, for example, "to attenuate undesirable harmonics or signals interfering at certain frequencies" (column 4, lines 45-47), the phrase "adapted to modulate" in its ordinary usage involves adding information to the signal or providing a variable input to the signal. That may involve, for example adding a second signal. Dent does not teach or suggest using his output network to modulate, or add information to the signal. Dent's filter merely operates on all signals passing through it in the same way. Therefore Dent's output network changes the signal but does not modulate the signal.

Nor there is there teaching or suggestion in Dent to provide a controller for providing a signal to control the electronically tunable output network as described in claims 28 and 60.

Nor there is there teaching or suggestion in Dent to provide a bias input for setting bias level of the power amplifier in which the bias level is adapted to the minimum level necessary to enable operation of the power amplifier, as described in claim 38.

Nor there is there teaching or suggestion in Dent to provide the output network including at least two reactive components connected as a tuned circuit, wherein at least one of the reactive components is adapted to being electronically tuned by a tuning signal, as described in claim 60.

Therefore the rejection of claims 1, 40, 47, and 56, and claims dependent thereon, under 35 U.S.C. § 102(b), as being anticipated by Dent has been traversed.

Claim Rejections– 35 U.S.C. § 103(a)

The Examiner rejects claims 6-9, 14, 17-19, 31, 32, 38, 41-46, and 61 under 35 U.S.C. § 103(a), as being unpatentable over Dent. Applicant would respectfully ask the Examiner to consider that independent claims 1, 40, 47, and 56, include the limit, "wherein a control line extends to said electronically tunable reactive component **for electronically varying reactance of said reactive component over more than two**

values." As discussed above under the 102 rejections Dent teaches against this limit by providing a switch that allows only two states. His description of the variable reactor does not teach or suggest adding additional states. Dent's switching scheme does not allow for more than the two states Dent provides. Further, a scheme with more than two states is not obvious from Dent since adding such a requirement to Dent would not be enabled by Dent's on-off switching scheme. Further invention would be needed to provide additional states. Thus, the rejection of claims 1, 40, 47, and 56 and claims dependent thereon under 35 U.S.C. § 103(a), as being unpatentable over Dent has been traversed.

The Examiner rejects claims 30, 33, and 34 under 35 U.S.C. § 103(a), as being unpatentable over Dent in view of Hotta. Nether Dent nor Hotta nor the combination teaches or suggests the limit, "wherein a control line extends to said electronically tunable reactive component **for electronically varying reactance of said reactive component over more than two values**." Thus, the rejection of independent claim 1 and claims dependent thereon, including claims 30, 33, and 34 has been traversed.

Claim 47 was previously amended to be dependent on claim 1. Therefore, applicant requests that the species be rejoined if claim 1 is allowable.

The prior art made of record and not relied up has been reviewed and is not believed to provide the limit missing from the cited references.

It is believed that the claims are in condition for allowance. Therefore, applicant respectfully requests favorable reconsideration. If there are any questions please call applicant's attorney at 802 864-1575. Applicant requests the opportunity to discuss this draft amendment with the Examiner at his earliest convenience. Thank you very much for your attention to this matter.

respectfully submitted,
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